

INDEX TO VOLUME XX.

[NOTE.—Titles of Papers are printed in *italic type*; names of Authors and Debaters are in **small caps.**]

	PAGE
Air engines, valves for.....	967
Air supply for combustion.....	781
ALDEN, G. I., <i>The plunger elevator</i>	629
ALDRICH, WM. S., <i>The variation of belt tensions with power transmitted</i> , 136 ; disc., heating plant of the University of Wisconsin, 929 ; disc., investigations of boiler explosions, 654 ; disc., note on strength of wheel rims, 128 ; disc., standards for direct-connected generating sets, 764 ; disc., valves for air compressors.....	996
<i>Allen Valve for locomotives</i> , C. H. QUEREAU.....	475
ALLISON, ROBT., disc., generation and utilization of steam.....	84
Amendment to Rule 10.....	15
Analysis of car-wheel iron.....	619
ASHLEY, F. M., disc., equipment of tall office buildings, 891 ; disc., the manufacture of car wheels.....	627
ASHWORTH, D., disc., generation and utilization of steam.....	87
BALDWIN, WM. J., disc., heating plant of the University of Wisconsin....	934
Ball-bearing nut.....	837
Barnard, Geo. A., memorial notice of.....	1008
BARTH, CARL G., disc., variation of belt tensions with power transmitted..	145
BATCHELLER, B. C., <i>A pneumatic dispatch-tube system for rapid transporta-</i> <i>tion of mails in cities</i>	373
Bauer, Chas. A., memorial notice of.....	1017
Bellhouse, R. W., memorial notice of.....	1014
Belt tension.....	136, 466
BENJAMIN, CHAS. H., <i>The bursting of small cast-iron fly-wheels</i>	209
BISSELL, G. W., <i>Experiences with deep-well pump rods</i>	725
<i>Boiler and furnace efficiency</i> , R. S. HALE.....	769
Boiler explosions, investigations of.....	649
Boiler tests.....	771
BOLTON, R. P., <i>Equipment of tall office buildings in New York City</i> , 873 ; disc., heating plant of the University of Wisconsin, 921 ; disc., me- chanical plant of a modern commercial building, 296 ; disc., pipe flanges and their bolts, 746 ; disc., the power plant of a university.....	721
BOYER, FRANCIS H., disc., experiences with deep-well pump rods, 735 ; disc., heating plant of the University of Wisconsin, 931 ; disc., pipe flanges and their bolts, 751 ; disc., rolling-mill fly-wheels, 960 ; disc., test of a steam separator, 491 ; disc., the plunger elevator	646
Brakes for elevators.....	858

	PAGE
BRASHEAR, J. A. , disc., rolling-mill fly-wheels.....	960
BRYAN, WM. H. , <i>The mechanical plant of a modern commercial building</i> , 243; disc., improvements in steam boilers, 114; disc., elevators, 864; disc., equipment of tall office buildings, 886; disc., heating plant of the University of Wisconsin, 920; disc., the power plant of a university, 722; disc., the plunger elevator.....	646
BULL, STORM , <i>The central heating plant of the University of Wisconsin at Madison, Wis.</i>	867
Bullock, Milan C. , memorial notice of.....	1006
<i>Bursting of small cast-iron fly-wheels</i> , C. H. BENJAMIN.....	209
<i>Calorific power of weathered coals</i> , R. S. HALE	333
CARPENTER, R. C. , <i>Experiments on the flow of steam through pipes</i>	342
CARY, A. A. , disc., machine shop floors	437
Car wheels, manufacture of	629
Castings.....	427
Cast-iron fly-wheels, bursting of.....	209
<i>Central heating plant of the University of Wisconsin</i> , STORM BULL.....	897
Central station heating	912
Chase, Wm. L., memorial notice of.....	1002
CHRISTIE, WM. WALLACE , disc., mechanical plant of a modern commercial building, 318; disc., bursting of cast-iron fly-wheels.....	232
Columbia University power plant	663
COMLY, GEO. N. , disc., rolling-mill fly-wheels	964
Committee on standards for generating sets.....	768
Compressors, valves for.....	7
Condenser and cooling tower installation	157
Controllers for elevators.....	853
Cook, Frederic, memorial notice of.....	1010
<i>Cooling tower and condenser installation</i> , J. H. VAIL.....	157
DALLETT, W. P. , disc., machine shop floors.....	439
DARLING, E. A. , <i>The power plant of a university</i>	663
DEAN, F. W. , disc., calorific power of weathered coals, 335; disc., improve- ments in steam boilers	120
Debes, J. C., memorial notice of.....	1005
Deep-well pump rods, experiences with.....	725
Direct-connected generating sets, standards for.....	758
Distribution of power from central station.....	912
Drum elevators.....	825
DURFEE, W. F. , disc., machine shop floors.....	437
DUTTON, C. SEYMOUR , disc., bursting of cast-iron fly-wheels.....	233
Efficiency, boiler and furnace.....	769
Elasticity in fly-wheels.....	944
ELDREDGE, A. H. , disc., improvements in steam boilers.....	115
Electric elevators.....	834
Electric motor for small tools.....	435
<i>Elevators</i> , C. R. PRATT	804
Elevators, plunger.....	629
Ellithorpe air cushion.....	817

	PAGE
EMORY, F. L. , Relation between initial tension and power transmitted, 466 ; test of a steam separator	485
Engineer, The , C. W. HUNT.....	3
<i>Equipment of tall office buildings in New York City</i> , R. P. BOLTON.....	873
Explosions, boiler, investigations of	649
<i>Experiences with deep-well pump rods</i> , G. W. BISSELL	725
<i>Experiments on the flow of steam through pipes</i> , R. C. CARPENTER.....	342
<i>Experiments on various types of fire hydrants</i> , CHAS. L. NEWCOMB.....	494
FICKINGER, P. J. , disc., what constitutes a seamless tube?	434
Fire hydrants, experiments on various types.....	494
Fire protection in office buildings	891
Flanges, pipe, and their bolts.....	737
Flow of steam through pipes, experiments on	342
Flue gas analysis.....	769
Fly-wheels, bursting of, 269 ; rolling-mill.....	944
FORBES, W. D. , disc., standards for direct-connected generating sets.....	766
Francis, James, memorial notice of	1003
FRITH, ARTHUR J. , disc., bursting of small cast-iron fly-wheels..	227
FRITZ, JOHN , <i>Rolling-mill fly-wheels</i> , 944 : disc., bursting of cast-iron fly-wheels.....	237
Furnace efficiency.....	769
Generating sets, direct-connected, standards for	758
<i>Generation and utilization of steam by the Lykens Valley Coal Company, Dauphin County, Pa.</i> , R. V. NORRIS.....	50
GORDON, F. W. , <i>A new system of valves for steam engines, air engines, and compressors</i>	967
GOSS, W. F. M. , disc., methods of testing indicators.....	417
GRIMM, P. H. , disc., heating plant of the University of Wisconsin.....	937
HALE, R. S. , <i>Boiler and furnace efficiency</i> , 769 ; <i>The calorific power of weathered coals</i>	333
HALSEY, F. A. , disc., electric motor for small tools, 435 ; junior meetings, 23 ; pipe flanges and their bolts, 745 ; rolling-mill fly-wheels	963
HAWKINS, J. T. , disc., pipe flanges and their bolts, 755 ; rolling-mill fly-wheels.....	961
Hemenway, Frank F. , memorial notice of	1000
HENDERSON, G. R. , <i>The manufacture of car wheels</i>	615
HENNING, G. C. , <i>Investigations of boiler explosions</i> , 649 ; <i>Report of Committee on Methods of Testing Materials</i> , 15 ; disc., bursting of cast-iron fly-wheels, 239 ; disc., rolling-mill fly-wheels.....	955
HIGGINS, C. P. , disc., pipe flanges and their bolts.....	755
HILL, G. H. , disc., elevators, 848, 871 ; disc , mechanical plant of a modern commercial building	313
HILL, GEORGE , disc., mechanical plant of a modern commercial building...	305
Hill, Hamilton A., memorial notice of	1012
Hindley worm for elevators	827, 868
Hunt, Alfred E., memorial notice of	1012
HUNT, CHAS. WALLACE , <i>The Engineer</i>	27

	PAGE
HUTTON, F. R., disc., experiences with deep-well pump rods.....	734
Hydrants, fire, experiments on.....	494
Hydraulic ash hoist.....	681
Hydraulic elevators.....	831
 <i>Improvements in steam boilers, and the brick settings of same</i> , W. B. LE VAN	95
Indicators, methods of testing	404
Inertia, theory of the moment of	177
Initial tension and power transmitted by a belt, relation between.....	466
<i>Investigations of boiler explosions</i> , G. C. HENNING	649
 Jacking of Marine furnaces	654
JACOBUS, D. S., <i>Methods of testing indicators</i> , 404 ; disc., note on strength of wheel rims	128
JACKSON, D. C., disc., electric motor for small tools	435
Johnson continuous flow-pump	726
JOHNSON, J. E., JR., disc., pipe flanges and their bolts.....	749
JONES, FORREST R., disc., bursting of fly-wheels, 231 ; heating plant of the University of Wisconsin, 926 ; investigations of boiler explosions, 655 ; pipe flanges and their bolts, 751 ; rolling-mill fly-wheels	958
Junior meetings	23, 452
 KENT, WM., disc., boiler and furnace efficiency, 794 ; calorific power of weathered coals, 336 ; cooling tower and condenser installation, 171 ; does it pay to pickle ordinary castings ? 429 ; experiments on flow of steam through pipes, 361 ; heating plant of the University of Wisconsin, 925 ; mechanical plant of a modern commercial building, 318 ; pipe flanges and their bolts, 748 ; rolling-mill fly-wheels, 953 ; strength of pipe fittings made by a casting process, 430 ; the manufacture of car wheels, 627 ; theory of the moment of inertia, 199 ; report of Committee on Revision of Boiler Code	17
KERR, C. V., <i>The theory of the moment of inertia</i> , 177 ; disc., rolling-mill fly-wheels, 951 ; disc., experiences with deep-well pump rods	734
Kimball, Hiram, memorial notice of	1011
Kruesi, John, memorial notice of	1009
 Land values under office buildings.....	874
LE VAN, WM. B., <i>Improvements in steam boilers, and the brick settings of same</i> , 95 ; disc., the plunger elevator.....	645
LEWIS, WILFRED, disc., relation between the tension and power of belts, 470 ; rolling-mill fly-wheels, 957 ; variation of belt tensions.....	147
 Machine shop floors.....	436
Mail tubes	373
MANSFIELD, A. K., Note on strength of wheel rims, 125 ; disc., mechanical plant of a modern commercial building, 295 ; disc., standards for direct- connected generating sets.....	763
<i>Manufacture of car wheels</i> , H. G. HENDERSON	615
MATTICE, A. M., disc., methods of testing indicators.....	413
MCBRIDE, JAMES, disc., bursting of cast-iron fly-wheels, 236 ; pipe flanges and their bolts, 747 ; rolling-mill fly-wheels	956

	PAGE
McElroy, Saml., memorial notice of.....	1004
McFARLAND, W. M., disc., investigations of boiler explosions.....	660
<i>Mechanical plant of a modern commercial building</i> , Wm. H. BRYAN.....	243
MEIER, E. D., disc., boiler and furnace efficiency.....	799
MELVILLE, G. W., disc., pipe flanges and their bolts.....	753
<i>Memorial notices of members deceased</i>	998
Messimer, Hillary, memorial notice of.....	1004
<i>Methods of testing indicators</i> , D. S. JACOBUS	404
MEYER, H. C., JR., disc., generation and utilization of steam, 91 ; pipe flanges and their bolts.....	755
Miller, Horace B., memorial notice of.....	1000
Miller, Lewis, memorial notice of.....	1014
Miltimore method of chilling car wheels.....	627
Modern commercial building, mechanical plant of.....	243
Molecular strains in castings.....	960
Moment of inertia, theory of.....	177
Muller, Maurice A., memorial notice of.....	1016
MULLER, T. H., disc., note on strength of wheel rims.....	129
NAGLE, A. F., pipe flanges and their bolts, 737 ; disc., mechanical plant of a modern commercial building, 295 ; valve gear of Willans engine... 48, 91	873
NEWCOMB, C. L., experiments on various types of fire hydrants, 494 ; disc., does it pay to pickle ordinary castings? 428 ; machine shop floors.....	436
<i>New system of valves for steam engines, air engines, and compressors</i> , F. W. GORDON	967
NORRIS, R. V., The generation and utilization of steam by the Lykens Valley Coal Company, Dauphin Co., Pa.....	50
<i>Note on strength of wheel rims</i> , A. K. MANSFIELD.....	125
Office buildings, equipment of.....	873
Oil separator, test of.....	489
Outlet valves for compressors.....	967
Pipe fittings made by casting process, strength of	429
<i>Pipe flanges and their bolts</i> , A. F. NAGLE.....	737
Pipe joints.....	737
Piping of a power plant.....	711
<i>Plunger elevator</i> , G. I. ALDEN	629
<i>Pneumatic dispatch-tube system for rapid transportation of mails in cities</i> , B. C. BATCHELLER.....	373
PORTER, CHAS. T., disc., Allen valve gear.....	482
Power plants for office buildings.	880
<i>Power plant of a university</i> , E. A. DARLING.....	663
PRATT, C. R., elevators.....	804
<i>President's address, "The Engineer"</i> , C. W. HUNT.....	3
Proceedings of New York XXXVIIth Meeting.....	3
Proceedings of Washington XXXIXth Meeting	443
Pump rods, deep-well, experiences with.....	737
QUEREAU, C. H., The Allen valve for locomotives	475

	PAGE
Rapieff joint.....	745
Refrigerating plant, for a medical school.....	676
<i>Relation between initial tension and power transmitted by belt</i> , F. L. EMORY.....	466
Report of Committee on Junior Meetings.....	452
Report of Committee on Revision of Boiler Code.....	17
Report of Committee on Uniform Methods of Testing Materials	15
ROBERTS, E. P., disc., equipment of tall office buildings, 887 ; standards for direct-connected generating sets.....	762
ROBISON, —— disc., heating plant of the University of Wisconsin.....	926
Rockwood joint.....	754
ROCKWOOD, GEO. I., disc., equipment of tall office buildings, 895 ; improvements in steam boilers, 120 ; pipe flanges and their bolts.....	754
ROGERS, W. S., disc., Allen valve gear, 483 ; elevators, 863 ; heating plant of the University of Wisconsin.....	933
<i>Rolling-mill fly-wheels</i> , JOHN FRITZ.....	944
Rose, Joshua, memorial notice of.....	1001
Safety devices for elevators	805
SANGUINETTI, PERCY A., disc., machine shop floors.....	439
Schneider, Henri, memorial notice of	998
Seamless tubes.....	430
SMITH, JESSE M., disc., bursting of cast-iron fly-wheels, 240 ; electric motor for small tools, 435 ; Oberlin, rolling-mill fly-wheels.....	954
SNELL, H. I., disc., generation and utilization of steam.....	88
SOUTHER, HENRY, disc., what constitutes a seamless tube.....	430
<i>Standards for direct-connected generating sets</i> , J. B. STANWOOD.....	758
STANWOOD, J. B., Standards for direct-connected generating sets, 758 ; disc., bursting of cast-iron fly-wheels, 235 ; rolling-mill fly-wheels....	958
Steam boilers, and the brick settings of same, improvements in.....	95
Steam engines, valves for.....	967
Steam generation and utilization by Lykens Valley Coal Co.	50
Steam separator, test of.....	85
Sterilizing plant.....	682
Strength of pipe fittings made by a casting process.....	429
Strength of wheel rims, note on.....	125
SUPLEE, H. H., disc., does it pay to pickle ordinary castings? 429 ; generation and utilization of steam, 91 ; note on strength of wheel rims, 129 ; pipe flanges and their bolts, 748 ; strength of pipe fittings made by a casting process.....	429
SVENSON, JOHN, Valve gear of the Willans Engine.....	42
System of valves for steam engines, air engines, and compressors	967
Tests of car wheels.....	615
<i>Tests of a steam separator</i> , F. L. EMORY	485
<i>Theory of the moment of inertia</i> , C. V. KERR.....	177
THURSTON, R. H., disc., equipment of tall office buildings.....	889
Tires for fly-wheels.....	960
Topical discussions and notes of experience.....	427
Tunnels for distribution of power.....	697, 908

	PAGE
University of Wisconsin, central heating plant of	897
University power plant.....	663
VAIL, J. H., <i>Cooling tower and condenser installation</i>	157
Valve gear of the Willans engine, JOHN SVENSON.....	42
Valves for steam engines, air engines, and compressors, system of.....	967
Variation of belt tensions with power transmitted, W. S. ALDRICH.....	136
WAGNER, E. C., disc., methods of testing indicators.....	416
Wagner, J. R., memorial notice of.....	1007
WALWORTH, ARTHUR C., disc., improvements in steam boilers.....	117
WALDRON, FRED. A., disc., rolling-mill fly-wheels.....	965
WEBB, J. BURKITT, disc., note on strength of wheel rims.....	134
Wear of deep-well pump rods.....	737
Weathered coals, calorific power of	333
Wheel rims, strength of.....	125
WHEELER, F. MERIAM, disc., cooling tower and condenser installation, 168 ; generation and utilization of steam.....	87
Willans engine, valve gear of.....	42
Wire-wound fly-wheels.....	960
WOOLSON, O. C., disc., does it pay to pickle ordinary castings?	427
Wrought metal fly-wheels.....	960